ISSUED BY
RPP-WTP PDC

R10679762

Mechanical Data Sheet:
PTF Vessel Vent Caustic Scrubber

Plant Item Number: 24590-PTF-MK-PVP-SCB-00002

Data Sheet Number: 24590-PTF-MKD-PVP-P0002, Rev 2

Project:	WTP	P&ID	24590-PTF-M6-PVP-P0017
Project No	24590	Calculation	24590-PTF-MEC-PVP-00002, Rev B / 24590-PTF-U0C-10-00010, RevB 2
Project Site	DOE Hanford	Process Data Sheet	None
Area No.	200E		
Building:	PTF	Vessel Drawing	24590-QL-POA-MKAS-00002-02-00011 2
System No.	PVP		

Service Data

Quality Level	Q Ref 1 2	Fabrication Specification	24590-WTP-3PS-MV00-TP001 & 24590-PTF-3PS-MKAS-TP001
Seismic Category	SC-II Ref 1	Design Code	ASME Section VIII Division 1
Service/Contents	Radioactive Liquid	Code Stamp	Yes
Design Specific Gravity	1.04 Ref 2 2	NB Registration	Yes
Max Operating Volume gal	2081 Ref 3 2	Wind Design	None
Total Volume gal	2296 Ref 3 2	Snow/Ash Design	None
Postweld Heat Treat	Not Required	Seismic Design	24590-WTP-3PS-MV00-TP002
Seismic Base Moment ft*lb	Deleted 2		24590-WTP-3PS-SS90-T0001
Environmental Qualification	All Metal 2		

Design Data

Packed Column Inside Diameter (A)	48" Ref 3 2 2	Floor to Bottom of Sump Vessel (E)	105 1/8" 2 2	Corrosion Allowance	0.04" Note3)Ref 5
Sump Vessel Inside Diameter (B)	108" Ref 3 2	Scrubber Height (F)	630 11/16" Ref 4	Minimum Design temperature for Metal °F	-20
Sump Height	83" min.	Ring Beam Height (G)	18"	Hydrostatic Test Pressure PSIG	Deleted 2
Dimension D	525 9/16" 2	Ring Beam Center-to Center Diameter (H)	108"		

		Vessel Operating	Vessel DesignRef 2	Deleted	Notes
Internal Pressure	PSIG	-1.5 2	-5/+15	Deleted	
External Pressure	PSIG	0	0	Deleted	Deleted
Temperature	°F	120	150	Deleted	

Safety Screening / Evaluation Required? If yes per 24590-WTP-GPP-SREG-002, E&NS Signature Below 2 2 Yes X No

Materials of Construction

Component	Material Ref 5	Containment	Notes
Column Top Head	SA-240 316	Primary	Notes 4 and 8
Column Shell	SA-240 316	Primary	Notes 4 and 8
Sump Vessel Top Head	SA-240 316	Primary	Notes 4 and 8
Sump Vessel Shell	SA-240 316	Primary	Notes 4 and 8
Sump Vessel Bottom Head	SA-240 316	Primary	Notes 4 and 8
Vessel Internals	SA-240 316	N/A	Notes 4, 5 and 8
Dry Packing	UNS N08367/N08926	N/A	0.012" material thickness or maximum standard thickness available
Wet Packing	UNS N08367/N08926	N/A	0.012" material thickness or maximum standard thickness available
Vessel Support	SA-240 304	N/A	Note 4
Deleted			
Pipe	SA-312 TP316	Primary (Note 6)	Notes 4 and 8
Forgings/ Bar stock	SA-182 F316	N/A	Notes 4 and 8
Gaskets	None		
Bolting	None		
Mounting Base	Note 7	N/A	18" high ring beam 2

Miscellaneous Data

Orientation	Vertical
Support Type	Skirt
Insulation Function	None
Insulation Thickness inch	None
Insulation Material	None
External Finish	Welds descaled as laid
Internal Finish	Welds ground smooth

	Dry Weight (lbs)	Dry C G (inches: X,Y,Z)	Operating Weight (lbs)	Operate C G. (inches: X,Y,Z)	Testing Weight (lbs)	Shipping Wt (lbs)
Scrubber	61,242	0.351, 0.694, 240.327	80,919	0.265, 0.525, 220.179	NA	66,242
Packed Column	18,114	0.000, 0.000, 412.096	19,137	0.000, 0.000, 412.641		
Sump Vessel	26,315	0.000, 0.000, 176.098	44,969	0.000, 0.000, 161.762		

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

Contents of this document are Dangerous Waste Permit affecting.

BHARAT V. MAKADIA
STATE OF WASHINGTON
19383
REGISTERED
PROFESSIONAL ENGINEER
2/6/07

EXPIRES: 5/5/2008

This Bound Document Contains a total of 5 sheets

INCORPORATE SDCR # 24590-WTP-SDCR-M-06-00132 12/8/06

Rev.	Reason for Issue	Preparer	Checker	Reviewer	E&NS	Approver	Date
2	Issue for Permitting Use	C. Thompson	D. Rickettson	G. Goolsby	N/A	J. Jolyk	12/8/06
1	Issue for Permitting Use	C. Thompson	D Pease / L. Han	C. Morley	N/A	J. Jolyk	11/28/05
0	Issue for Permitting Use	C Thompson	D Pease	C. Morley	N/A	M. Hoffmann	11/18/04

BECHTEL	**Mechanical Data Sheet:** **PTF Vessel Vent Caustic Scrubber**	Plant Item Number 24590-PTF-MK-PVP-SCB-00002 Data Sheet Number 24590-PTF-MKD-PVP-P0002, Rev 2

Notes

Note 1 : Deleted. △2
Note 2 : Deleted. △2
Note 3 : The corrosion allowance of 0.04" shall apply to all surfaces in contact with process fluids except for the dry and wet packings.
Note 4 : Material shall have a carbon content not to exceed 0.030%, dual certified.
Note 5 : Seller shall submit item details for customer review.
Note 6 : Nozzles are primary containment. The spare nozzle shall have a welded cap. See Note 8.
Note 7 : Ring Beam web and top flange shall be SA-240 304L, bottom flange shall be A-572 GR50.
Note 8 : All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination.
Note 9 . The scrubber is located in a Black Cell. (R5 / C5 area)
Note10: Contents of this document are Dangerous Waste Permit Affecting △2
Note11:References are included for BNI use only and will not be shown with revision triangles - only data being changed will require revision triangles. △2

References (For Internal Use Only) △2

Reference 1	P&ID-PTF Pretreatment Vessel Vent Process System Caustic Scrubber to HEMES, 24590-PTF-M6-PVP-00017, Rev 2
Reference 2	PTF Vessel Cyclic Datasheet Inputs, 24590-PTF-MVC-10-00003, Rev B
Reference 3	Data Sheet Page 1 Seller Data, 3/02/05, 24590-QL-POA-MKAS-00002-03-00001, Rev 00E
Reference 4	PTF Vessel Vent Caustic Scrubber Bechtel Job No 24590-PTI shop No C-2600-NQA 1 Assembly & Sections, 24590-QL-POA-MKAS-00002-02-00011, Rev 00D
Reference 5	Corrosion Evaluation, 24590-PTF-N1D-PVP-00001, Rev 6

Notes for Outline Profile of the PTF Vessel Vent Caustic Scrubber

Note 1: See "Design Data" in sheet 1 of 5 for the bounding dimensions of the scrubber.

Note 2: The maximum sump batch volume shall be determined based on given dimensions:
- Seller to provide the batch volume and total time of operation per batch based on runback, maximum expected condensate and caustic makeup.

Note 3: The minimum allowance from maximum sump operating volume to overflow shall satisfy the larger of all three conditions below:
- minimum 2" liquid depth
- at least 2% of maximum operating liquid depth
- change in liquid level equivalent to 5 minutes of maximum liquid accumulation in the scrubber sump

Note 4: Nozzle requirements are as follows:
- Unless noted otherwise, nozzles shall extend 12 inches beyond the vessel.
- Nozzle schedule shall be determined by the Seller, taking into consideration all requirements stated in Buyer document # 24590-WTP-3PS-MV00-TP001, *Engineering Specification for Pressure Vessel Design and Fabrication.*
- All nozzles with connecting pipes shall be end-prepared per Buyer document # 24590-WTP-PW-P30T-00001, *WTP End Prep Detail for Field Butt Welds* , to tie in with the respective connecting pipe size and schedule in note 7 △2
- Seller shall confirm size and schedule/wall thickness for all nozzles,specified in note 7 below.

Note 5: Ring Beam Detail
- Refer to Buyer document 24590-WTP-MV-M59T-00001, for ring beam details.
- △2 Ring beam top and bottom flanges shall be 6" wide.
- △2 Ring beam web shall be 3/4" thick.
- △2 The ring beam web to flange weld shall be full penetration.
- △2 Ring beam design per River Protection Project - Waste Treatment Plant, vessel supports at El. 0' and below, 24590-PTF-DDC-S13T-00001.
- △2 NDE requirements shall be in accordance with 24590-WTP-3PS-SS00-T0002, section 11.6 "Additional Examination for Quality Levels 1 and 2 Structural Steel Welds". All welds of Ring beam are critical welds.

  Section 11.6 is mandatory even if the web to flange weld NDE is not indicated on the drawing.

Note 6: Locate inlet nozzle (N01) on the sump vessel and use as inspection manway. Inlet nozzle (N01) must be higher than the overflow nozzle (N12).

Note 7: Nozzle data are as follows:

Nozzle No.	Size	Connecting Pipe NPS	Schedule	Function
N01	24" NPS	24	0.375"	Offgas Inlet
N02	24" NPS	24	0.375"	Offgas Outlet
N03	2" NPS	2	40S	Recirculated Caustic Solution for Mixing (dip pipe) △2
N04	2" NPS	2	40S	Recirculated Caustic Solution for Scrubbing
N05	4" NPS	4	40S	Pump Suction
N06	1" NPS	1	40S	Demineralized Water Inlet
N07	1" NPS	1	40S	Demineralized Water Inlet
N08	1.5" NPS	1.5	40S	Reagent Inlet (5M NaOH)
Deleted				
Deleted				
N11	1" NPS	1	40S	Sample Recirculation Return
N12	6" NPS	6	10S	Scrubber Sump Vessel Overflow
N13	6" NPS	1	40S	Bubbler Type Level Indicator (See Detail 19, Dwg. 24590-WTP-MV-M59T-00016002)
N14	3" NPS			Spare (with welded cap)
N15	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
N16	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
N17	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
N18	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
Deleted				
Deleted				

NPS - Nominal Pipe Size (inch)
OD - Outside Diameter (inch)

BECHTEL	**Mechanical Data Sheet:** **PTF Vessel Vent Caustic Scrubber**	Plant Item Number 24590-PTF-MK-PVP-SCB-00002 Data Sheet Number 24590-PTF-MKD-PVP-P0002, Rev 2

Notes

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Notes for Outline Profile of the PTF Vessel Vent Caustic Scrubber

Note 1: See "Design Data" in sheet 1 of 5 for the bounding dimensions of the scrubber.

Note 2: The maximum sump batch volume shall be determined based on given dimensions
- Seller to provide the batch volume and total time of operation per batch based on runback, maximum expected condensate and caustic makeup

Note 3 The minimum allowance from maximum sump operating volume to overflow shall satisfy the larger of all three conditions below:
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Note 5 Ring Beam Detail
- Refer to Buyer document 24590-WTP-MV-M59T-00001, for ring beam details.
2 - Ring beam top and bottom flanges shall be 6" wide.
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2 - The ring beam web to flange weld shall be full penetration.
2 - Ring beam design per River Protection Project - Waste Treatment Plant, vessel supports at El. 0' and below, 24590-PTF-DDC-S13T-00001
2 - NDE requirements shall be in accordance with 24590-WTP-3PS-SS00-T0002, section 11 6 "Additional Examination for Quality Levels 1 and 2 Structural Steel Welds". All welds of Ring beam are critical welds.
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Note 7 Nozzle data are as follows:

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No	Size	NPS	Schedule	
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N06	1" NPS	1	40S	Demineralized Water Inlet
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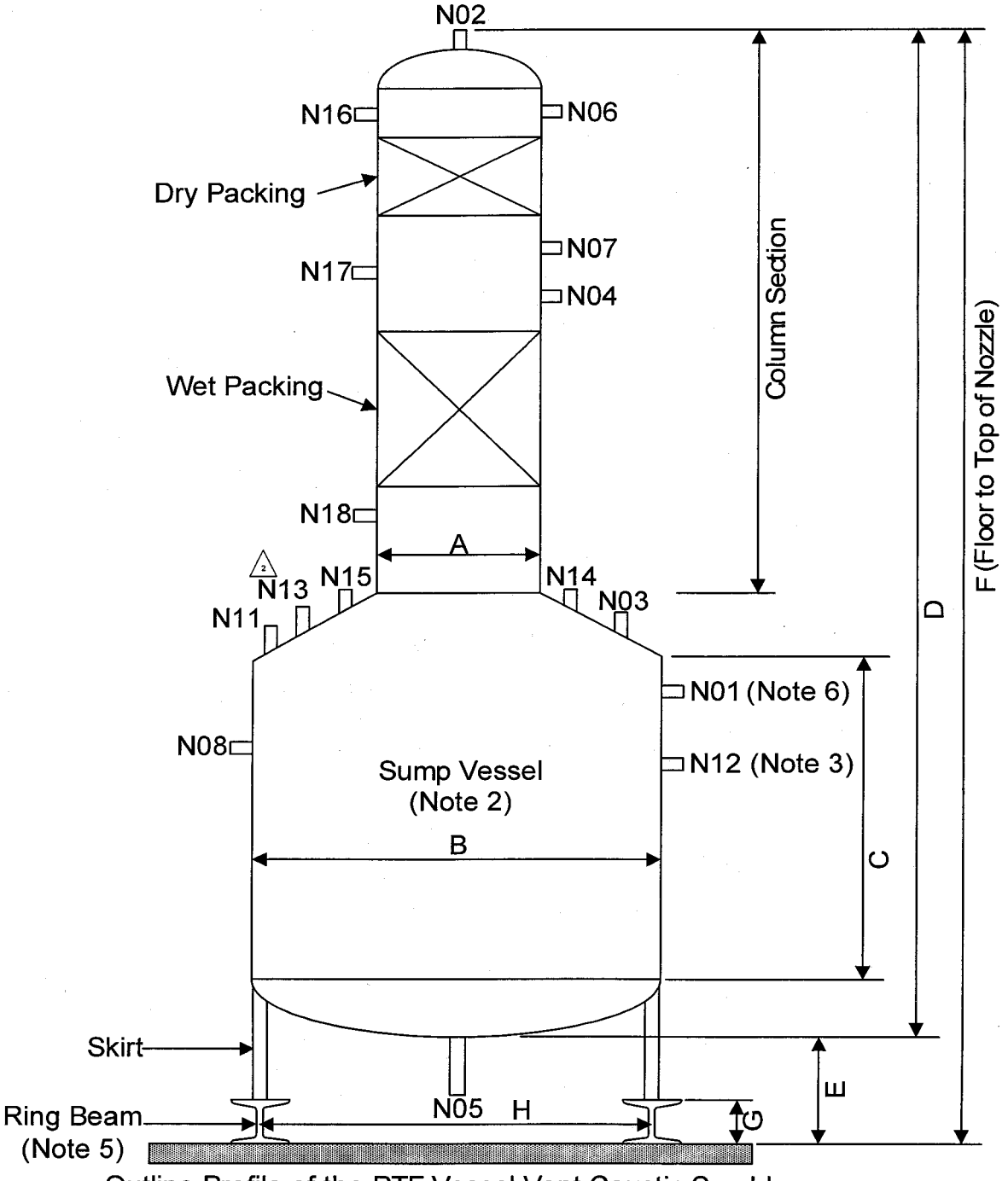
N18	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
Deleted				
Deleted				

NPS - Nominal Pipe Size (inch)
OD - Outside Diameter (inch)

BECHTEL	**Mechanical Data Sheet:** **PTF Vessel Vent Caustic Scrubber**	Plant Item Number **24590-PTF-MK-PVP-SCB-00002** Data Sheet Number **24590-PTF-MKD-PVP-P0002, Rev 2**



Outline Profile of the PTF Vessel Vent Caustic Scrubber

Mechanical Data Sheet:
PTF Vessel Vent Caustic Scrubber

Plant Item Number: 24590-PTF-MK-PVP-SCB-00002

Data Sheet Number: 24590-PTF-MKD-PVP-P0002, Rev 2

Description		Instrument Tag	Unit	Operating			Remarks
				Lo	Normal	Hi	
Inlet Offgas	Pressure	PC-0404	W.G.	-40 0" (2)	-35.0" (2)	-10" (2)	
Inlet Offgas	Temperature	TI-0401	°F	113	120	130	
Inlet Offgas	Volume Flow Rate		SCFM	(Note 2)	3600	3600	
Inlet Offgas	Rel. Humidity		%		100	100	
Inlet Offgas	NO_2		ppm vol		130		Dry basis concentration (2)
Inlet Offgas	NO		ppm vol		70		Dry basis concentration (2)
Inlet Offgas	CO_2		ppm vol		330		Dry basis concentration (2)
Scrubber Sump Vessel	Pressure	PI-0408	W.G	-40.0" (2)	-35 0" (2)	-10" (2)	
Scrubber Sump Vessel	Liquid Temperature	TC-0405	°F		111		
Scrubber Sump Vessel	Liquid Level	LI-0409		23 4" (2)	23.4 - 63.3" (2)	63 3" (2)	Overflow is at 66.03" (note 4) (2)
Scrubbing Liquid	pH		pH	7 (2)	7.0 - 7.5 (2)	7.5 (2)	
Scrubbing Liquid (2)	Density	DI-1704	lbs/ft^3	*	62 3 * (2)	*	
Recirc. to sump - mixing	Flow Rate	FI-0461	GPM		60*		
Recirc. to packing - scrubbing	Flow Rate	FI-0444	GPM		60*		
Recirc to packing - scrubbing	Temperature		°F		70		
Deleted							
Deleted							
Deleted							
Deleted							
Deleted							
Packed Section	Pressure Drop	PDI-0406	W.G.		3 0" (2)	6 0"	Max. allowable (Note 1)
Demineralized Water Inlet at Nozzle N06	Flow Rate		GPM	N.A.	22.5 (2)	N.A.	
Dry Packing	Pressure Drop	PDI-0407	W G.		0 2 (2)	1.0"	Max. allowable (Note 1)
Demineralized Water Inlet at Nozzle N07	Flow Rate		GPM	N A.	22 5 (2)	N A.	Mfr. Suggests a periodic flush of 1 GPM/sq. ft. min. (2)
Outlet Offgas	Pressure		W.G.	-47.0" (2)	-42.0" (2)	-17" (2)	
Outlet Offgas	Temperature		°F	77	77	77	
Outlet Offgas	Mass Flow Rate		kg/hr				
Outlet Offgas	Flow Rate		SCFM		3600	3600	
Outlet Offgas	Rel. Humidity		%		100	100	
Outlet Offgas	NO_2		ppm vol		41 (2)		Dry basis concentration (2)
Outlet Offgas	NO		ppm vol		70 (2)		Dry basis concentration (2)
Outlet Offgas	CO_2		ppm vol		329 (2)		Dry basis concentration (2)
DF (minimum) for Nitrogen Oxides			DF		1 8*		
DF (minimum) for Solid Particulates			DF		3.5*		2.0 micron particulates

Notes

* - Seller to verify/provide data

1 - Maximum differential pressure across scrubber in clean condition shall not exceed 8 in-WG. Seller to provide data.

2 - Standard conditions of flow are 77 deg F and 1 atmosphere as dry air (density = 0.074 lb/ft^3) - humidity accounts for additional volume and mass flow

3 - Deleted

4- Dimension is measured from inside bottom of vessel sump to bottom of nozzle N12. (2)

BECHTEL	**Mechanical Data Sheet:** **PTF Vessel Vent Caustic Scrubber**	Plant Item Number [redacted]-PTF-MK-PVP-SCB-00002 Data Sheet Number [redacted]-PTF-MKD-PVP-P0002, Rev 2

2 **Equipment Cyclic Data Sheet** Ref 2

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Design Life	*40 Years*
Component Function and Life Cycle Description	*See Specification 24590-PTF-3PS-MKAS-TP001*

Load Type		Min	Max	Number of Cycles	Comments
Design Pressure	PSIG	*-5*	*+15*	10	*WTP Calculation 24590-PTF-MVC-10-00003*
Operating Pressure 1	PSIG	*-1.5*	*0*	7,000,000	*WTP Calculation 24590-PTF-MVC-10-00003*
Operating Pressure 2	PSIG	*0*	*+2.8*	40	*WTP Calculation 24590-PTF-MVC-10-00003*
Operating Temperature	°F	*120*	*145*	40	*WTP Calculation 24590-PTF-MVC-10-00003*
Contents Spcific Gravity		*1.0*	*1.04*	1,040	*WTP Calculation 24590-PTF-MVC-10-00003*
Contents Level	inch	*23*	*63*	15,000	*WTP Calculation 24590-PTF-MVC-10-00003*
Localized Features					
Nozzles		*N/A*		*WTP Calculation 24590-PTF-MVC-10-00003*	

Notes

1 Cycle increase. The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.